Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

DEC 24 1941

ACE-106

RESEARCH ON PRESENT USES OF COTTON AND COTTONSEED

Remarks by Dr. Henry G. Knight, Chief, Bureau of Agricultural Chemistry and Engineering, United States Department of Agriculture, before the International Cotton Congress, Waco, Texas, June 26, 1941.

LIBRARY
BUREAU
AGRICULTURAL
U.S. DEPARTMENT OF A

--ooOoo--

Last year I appeared before the International Cotton Congress and spoke on "A New Research Attack on the Cotton Problem." My subject this year is "Research on Present Uses of Cotton and Cottonseed." So what I have to say to you today may be considered complementary to the talk I made last year.

While it is recognized that it is highly desirable to develop new uses for cotton, it is also important that we hold present markets. Research in this day and age is not confined to any one field. Any industry which does not vigorously prosecute research is apt to find itself without a market for its goods.

For example, if you were running a store today and a competitor who had recently moved into the same block began to get some of your trade, what would you do? Well, to begin with you'd probably cut the prices on some of your merchandise. But there would be a point beyond which you could not cut prices and stay in business. And if you continued to lose customers, then what would you do? For one thing, you would try to get new customers to take the place of those who had left. And you would probably try every possible means of getting back your lost customers and preventing others from leaving. Or you might try to induce your present customers to buy more of your merchandise.

In this hypothetical case, we have a simplified analogy with our cotton growing industry: competing merchandise - competing growths of cotton and other fibers and materials; loss of customers - loss of exports and inroads from other fibers and materials; new customers - new uses, and so on.

When we consider means of increasing the utilization of American cotton, most of us think in terms of new uses; that is, new customers. But if we neglect our present customers we shall lose some of them, and their loss may easily offset any gains derived from the sale of merchandise to new customers. Further, the cash of a customer regained is worth just as much as that of a new customer, and this is true also of additional purchases by an old customer. We might well ask ourselves the question, which of these various classes of customers is deserving of most attention? The answer, I think, is obvious; if this store represents our means of livelihood, we cannot afford to neglect any class of customer.

But let us dispense with this analogy and consider directly the problem of maintaining and expanding the consumption of cotton in present uses. Is research devoted to this end worth while? What can be expected from it? When the fields of research on cotton were being selected for the Southern Regional Research Laboratory, these and similar questions had to be answered with a definiteness beyond any reasonable degree of doubt. Research on maintaining and extending the consumption of cotton in present uses was considered so important that it has been definitely selected to receive specific attention in the Southern Regional Research Laboratory.

Very briefly, without an attempt to give all the considerations involved, I want to show you that research of this type is important and indicate what may be expected from it.

First, let us classify the consumption of cotton in the United States, and note some pertinent facts regarding the different types of uses. More than 98 percent of the cotton lint consumed in this country goes into the manufacture of woven and knit fabrics, twine and cordage, yarns, and other uses such as wadding, batting, absorbent cotton, etc., where cotton retains most or all of its basic physical properties. About 40 percent of the cotton consumed goes into industrial uses; that is, uses like automobile tire fabrics, bags, twine and cordage, and belting as distinguished from clothing and household uses. In most industrial uses, the durability of the fabric under moderate to severe treatment is a matter of primary importance in its selection. Another equally important consideration in industrial uses is the relative price of competing materials. When a fabric is to be used by the initial purchaser until it is unfit for further service, the amount of satisfactory service per dollar often determines the choice of fabrics or other materials.

In clothing and household fabrics, which represent about 40 percent and 20 percent, respectively, of our domestic consumption, the factors of competition are somewhat different from those in industrial uses, though durability and price are also important. In many clothing and household uses, appearance and feel, along with a certain required minimum of durability, are the competitive factors of greatest importance.

Although the factors of competition are somewhat different in these various classes of uses, the individual uses all have one characteristic in common - they are constantly changing. New uses appear from time to time, increasing the demand for certain grades and staples of cotton, while consumption through some existing use is being curtailed or even completely stopped. Up to about 1930, cotton consumption in the United States was in a generally expansive period, so that decreased consumption in some channels was at least offset by increased consumption in others. For example, the decreased use of cotton in women's hosiery that occurred from 1920 to 1930 was more than offset by the large increase that occurred in the consumption of cotton in automobile tires. But whereas many of these changes prior to 1930 represented merely a shifting from one type of cotton product to another, especially in the field of clothing and household uses, in recent years an increasing number of these changes have been caused by the direct substitution of other textiles and other materials for cotton products.

An example of this substitution in industrial uses is to be found in the cement industry. For the 25 years ending with 1925, nearly 90 percent of total cement shipments were made in cotton bags, but since 1930 less than 40 percent of the shipments were made in cotton bags, while more than 40 percent were in paper bags, and the remainder shipped in bulk. Another example is the substitution of consumer-size paper bags and cartons for cotton bags in the grocery trade.

In clothing and household uses, there has been an appreciable displacement of cotton by rayon in the manufacture of certain types of fabrics. As a typical example, one of the larger cotton mills used to finish about four million yards per week of cotton nainsook, which was largely used for women's underwear and infants' clothing, but processing of this type of goods has now dropped to about 600,000 yards per week, or about 15 percent of the former output, partly because of competition from rayon. Rayon has also displaced large quantities of cotton in other types of women's underwear and in such articles as slips, certain types of dresses, window curtains, bedspreads, table cloths and men's socks.

I could give you other examples of how cotton has been displaced in present uses, and I could call your attention to the development of new industrial fibers such as Nylon, Vinyon, and Fiberglass, but I think that the limited number of examples already given in sufficient to show the need of research to maintain the consumption of cotton in present uses. Moreover, since research of this nature necessarily involves the development of cheaper and higher quality cotton products, it is obvious that the same type of research can be applied to increase, as well as maintain, the consumption of cotton in present uses.

By far the bulk of domestic cotton uses appears to be in no danger at all from competing products for many years to come, but there are many small uses and some not so small, which have already been lost, and there are many others that are in danger of being lost.

Although individually these uses may be comparatively small, in the aggregate they assume considerable importance. Cotton in all uses is today facing greater competition than at any other time in its history, and it appears almost certain that this competition will become even keener in the future. It is important that we do not lose sight of this fact at the present time when domestic cotton consumption is at such a high level. We all know that a large part of this high level is directly due to purchases for national defense and to increased purchasing power of those employed in national defense industries.

This still leaves unanswered the question of what may be expected from research on cotton in present uses. That is, can we expect it to be successful? In my opinion, the answer is "yes," and my answer is not based solely on faith in the effectiveness of research methods, although there is necessarily a large element of faith involved where research is concerned. Let me outline briefly a few representative considerations upon which my answer is based.

I have here a small quantity of long staple cotton, and here a few ounces of yarn made from it and spun so fine that it takes 50 miles of it to make one pound. This is not a "believe-it-or-not" yarn, but is a type of yarn that is being produced every day on ordinary textile machinery for use in the manufacture of typewriter ribbons, airplane fabrics, fine dress goods, etc. Compare this yarn, if you will, with the coarse, rough, highly irregular, cotton yarns that were produced on the first power driven spinning machine invented 200 years ago. But we do not have to go back that far to note advances in the manufacturing of cotton products and improvements made in their quality. Today we have water-repellent shower curtains and table cloths, and shirts guaranteed not to shrink out of size. These have been developed within the memory of everyone here. In the way of reducing the cost of cotton products, modifications in machinery and methods which have been effected during the past 15 to 20 years have resulted in an appreciable reduction in cost, amounting in some instances to from two to three cents per pound on certain types of fabrics.

These are just random examples. The point I am trying to make is that cotton is a raw material possessing a highly complex set of properties, and that as man learns more about these properties and invents machinery to better utilize these properties, he is able to produce goods of increasing usefulness.

The opportunities for making further advances are greater today than ever before. Modern developments in science and engineering have placed at our disposal more powerful methods of research, not now being utilized to their fullest, and the incentive to lower the cost and increase the quality of cotton products is certainly greater today than at any other time in the history of our cotton industry. Concerted and intensive research of this nature can, therefore, be expected to produce worthwhile results toward maintaining and expanding the consumption of cotton in present uses.

And now let me give you one concrete example of what technological and scientific research can accomplish in the way of aiding cotton to compete with other products, namely, the development of automobile tire fabric.

Modern cord tire fabric is itself a true product of research. It is fascinating to trace its gradual evolution from the types used in the old high pressure casings into the types now used in our durable, high-speed balloon tires, but time does not permit my doing this. More recently, we have had an example of research in the field of tire fabrics which should caution us against ever writing "finis" on the development of any product, no matter how satisfactory it may seem. With high trucks lumbering over the country at 50 miles an hour on mammoth tires containing nearly a bale of cotton in the form of fabric, and with these tires performing in a way in which no one ever dreamed tires could ever be made to perform, it seemed that little was left to be desired in the way of further improvement. But there suddenly appeared in this field the fruits of intensive research on another type of fiber - rayon. In 1937, a truck tire with cord fabric made from rayon, instead of cotton, was placed on the market. Though more expensive, this rayon-cord tire was reported to be more durable than existing cotton-cord tires under extra-heavy loads in sustained high-speed service. About a year later, rayon-cord tires designed for the extra-quality passenger car tire were announced.

This looked very much like a trend of great danger to cotton, for about 8 percent of all the domestically consumed cotton each year goes into tire fabrics. But manufacturers of cotton cord-fabric got busy and the results of their efforts are distinctly encouraging to producers and processors of cotton. A little over two years ago a new type of cotton cord fabric, the result of research, was placed on the market and its makers claim that it out-performs any other type of fabric.

The extent to which rayon may eventually replace cotton in this field is still uncertain, but these recent improvements in the design of cotton tire cords, through research, have undoubtedly narrowed the field potentially open to rayon, and definitely prove that research is effective in maintaining the consumption of cotton in present uses. Moreover, the same type of research, through the lowering of costs and improvement of quality, can be used as a means of increasing the consumption of cotton.

Now let us consider the question of research on present uses of cottonseed. Our problems resulting from surpluses of cotton lint are so acute that we sometimes overlook those involving cottonseed. But problems involving a commodity which has an annual cash value of 100 million dollars should, and must, be given serious consideration.

The cotton producer is unable to grow or not grow cottonseed at will. When he grows cotton he also grows cottonseed, and if the prices he receives from cottonseed are unfavorable, this affects his total income from cotton. The price at which cottonseed sells is, of course, determined by the demand for cottonseed products; that is, oil, cake and meal, linters, hull fiber, and hulls. As you know, the Southern Regional Research Laboratory will conduct research to develop new and expanded markets for cottonseed oil, cake and meal, linters, and hull fiber.

Opportunities exist for finding both new and expanded markets for cottonseed products, but it is not possible to divide this research sharply on this basis. For example, if certain specific properties of the oil as now produced can be changed, this will result not only in increased consumption in present markets, but will also make cottonseed oil suitable for certain other markets now being supplied by other types of oil. Nevertheless, much of the research to be conducted on cottonseed products at the Southern Regional Research Laboratory can be looked upon as an effort to maintain and expand the use of cottonseed products in present markets.

Although cottonseed products, as we now know them, have not been in commercial use for anywhere near as long a time as cotton lint, the cottonseed products industry is by no means a new one. But just because this industry is firmly established, it does not follow that markets for its products will always exist, or that they can be held without the aid of research and other efforts directed toward that end. For example, oleomargarine products provide one of the big outlets for cottonseed oil, but from 1934 to 1939 the consumption of soybean oil for this purpose increased from a few thousand pounds to 71 million pounds, and it may be expected to increase further. Research on improved methods of processing cottonseed for oil will help to meet this competition.

Another example of how impermanent a market may be is to be found in the use of linters in the manufacture of rayon. Not many people know how close linters came to being almost shut out of the rayon market. During 1935 and 1936, there was an extremely rapid shift from linters to wood pulp in the manufacture of Viscose rayon. Consumption of linters in this type of rayon decreased from about 120,000 bales in 1935 to less than 40,000 bales in 1937, in spite of the fact that the production of

Viscose rayon was increasing rapidly. Fortunately, the combined production of Acetate and Cuprammonium rayon, both made almost entirely from cotton linters, also was increasing very rapidly, so that today the consumption of linters in rayon is as great as it ever was. But concerted efforts are being made to develop wood pulp suitable for all types of Acetate and Cuprammonium rayons, and, since wood pulp is always cheaper than purified linters, these efforts will continue. Those interested in cotton, therefore, cannot afford to allow any lag in the research efforts to maintain cotton and linters on an equal footing as an available, satisfactory raw material. Research to develop more satisfactory methods for storing seeds, and improved methods of delinting the seed for chemical uses will be an important factor in determining whether linters will be able to hold these remaining rayon markets. This is also true regarding the use of linters in smokeless powder, which is of such importance at this time, and is true in regard to the use of linters for other chemical uses.

I spoke a moment ago about the competition between soybean oil and cottonseed oil. Soybean meal also competes with cottonseed meal, which is the second most valuable cottonseed product. Production of soybean meal has risen during recent years until in 1940 it was estimated at about one and a third million tons, as compared to a production for cottonseed meal of two million tons.

In cottonseed meal we have a great reservoir of protein wealth, available for human nutrition if in an emergency we should need such material. To make available this potential wealth, there is need for fundamental and applied research to develop methods for extraction and purification of edible protein. This has not been done before, because we have in this wonderful country such an abundance of satisfactory protein in our cereals, eggs, fish, and meat that it has not been profitable to seriously undertake to tap this protein reservoir. However, it is there if we need it - and research is the key to open it.

These three examples involving the three principal cottonseed products - oil, meal, and linters - are examples of the fact that cottonseed products are not merely facing competition from other products, but that this competition is becoming more effective each year. Research to lower the cost and improve the quality of cottonseed products is the only sound method of meeting this competition.

As I mentioned earlier, research to maintain and expand the consumption of cotton and cottonseed in present uses has been made an important part of the research program of the Southern Regional Research Laboratory, This research, together with that on developing new uses and that aimed at regaining some of our lost uses, form a complete research attack which it is hoped will help to increase the consumption and value of American cotton.